

CHAPTER SIX

Effects of Decentralization on Environmental Sustainability and Indigenous Food Systems in Ghana

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Abstract

This chapter investigates the effects of decentralization on environmental sustainability and Indigenous food systems in Ghana. The government of Ghana introduced decentralization in the 1980s and subsequently revised it in the 2000s to ensure the governance is closer to the doorsteps of the populace. Even though decentralization brought several advantages, including giving the local authorities the power to decide and initiate developmental projects. However, decentralization has some challenges and unintended consequences in most emerging economies. Consequently, the study examines how decentralization in Ghana is influencing environmental sustainability policies in Ghana. Using an anti-colonial theoretical framework, this qualitative study interviewed 16 participants, ranging from experts from the Ministry of Food and Agriculture, the Food and Agriculture Organization, university professors and students and representatives of the Peasant Farmers Association of Ghana. The study discovered that the decentralized system has resulted in the detachment of the District Department of Agriculture (DDA) from the Ministry of Food and Agriculture and placed them under the Metropolitan, Municipal, and District Assemblies (MMDAs). Consequently, budgetary allocations to DDAs go into the account of MMDAs before being forwarded to the DDA. This causes a significant delay to DDAs in receiving funds to implement environmentally sustainable policies, resulting in a severe impact on traditional food crops, which are growing with less resistance to the worsening climate. The study recommends that the government should prioritize environmental sustainability in Ghana to save the indigenous food system from extinction.

Keywords: Decentralization, Indigenous food system, environmental sustainability, developmental gap, political decentralization

Introduction

According to governance experts, decentralization is a process where governance is brought to the local level to empower people to decide on their developmental trajectory (Faguet, 2021; Ibrahim, 2024; Shah & Thompson, 2004). Decentralization can be political, in which case, the government hands over decision-making power to local authorities or fiscal decentralization, which implies a transfer of financial authority to local administration. The decentralization in Ghana is akin to political decentralization. Scholars such as Ibrahim (2024) and Minakova (2023) conceptualized political decentralization as a process in which the central government hands over some authority to local governments to enable more effective and efficient decision-making at the local level. Political decentralization aims at improving public service by accelerating the decision-making process, facilitating and encouraging citizens' participation in governance and reducing the central administrative burden (Madhavan et al., 2023). Decentralization offers diverse key benefits that improve organizational performance. For instance, distributing decision-making authority across diverse levels reduces bureaucracy and boosts flexibility, allowing units to adapt strategies based on regional demands (Ibrahim, 2024; Golyk, 2022). This improves speed and efficiency, authorizing local managers to respond quickly without waiting for central approval. Studies have found that decentralization of organizations enables employees to benefit from more significant empowerment and accountability, increasing motivation and fostering leadership development (Suebvises, 2024; Tavares, Vale & Costa, 2024). Furthermore, decentralization promotes innovation as individuals or teams explore fresh concepts or ideas specific to the needs of the organization. Decentralization helps to maintain customer relationships by offering personalized benefits that align with local market needs. Additionally, since issues can be settled at lower or local levels, it reduces the pressure on senior management, allowing them to concentrate on major issues related to long-term strategy. Furthermore, risk is sufficiently addressed since failures in one unit do not impede the entire organization. Specifically, decentralization creates a more responsive and dynamic business environment, yielding better outcomes for organizations (Tavares, Vale & Costa, 2024; World Bank, 2021).

Despite the advantages of decentralization, it also has some significant setbacks, including inconsistencies in decision-making, as various units may adopt conflicting policies or standards (Tavares et al., 2024). When developmental projects are not properly managed with robust central oversight could lead to the risk of duplication of efforts and waste resources across divisions. There could be potential inefficiencies or mistakes in cases where lower-level managers lack the expertise to make complex decisions. Consequently, effective decentralization requires efficient and competent staff to see to the day-to-day running of the organization. Additionally, challenges with coordination between decentralized units are likely to aggravate, resulting in inadequate communication and fragmented operations. The financial cost of retaining numerous autonomous units can be higher due to additional staff and infrastructure requirements. Inadequate coordination within an organization could breed internal competition among departments, where organizational goals may be sacrificed to meet the objectives of various departments. Guaranteeing consistent quality and compliance gets more complicated when authority is dispersed across diverse locations. Some local managers may abuse their authority, leading to unethical practices or mismanagement. Moreover, long-term strategic alignment can be weakened without centralized oversight, as individual departments focus on short-term gains. Finally, decentralization may decline economies of scale, as purchasing, training, and other operations are managed singly rather

than consolidated (Madari, 2024; World Bank, 2021). Consequently, decentralization could have a significant impact on environmental management practices.

The world is facing an environmental crisis that requires immediate attention to avert future calamities. The crisis is widespread and capable of affecting the local economy, human health and survival. It is estimated that 80% of the world population inhabits areas that are susceptible to climate change and ecological crises (Zahra & Badeeb, 2022). Although urban areas constitute less than 3% of the global land surface, they disproportionately contribute to global emissions (Seto et al., 2014). The rising consumerism because of global economic expansion, changes in food habits from the Indigenous food system to Western-style cuisine characterized by energy-dependent refined foods, over-dependency on fossil fuel in automobile industries and industrial agriculture, etc., necessitate sustainable environmental practices to avoid future catastrophe. Some of the measures proposed by scholars to ensure environmental sustainability include fiscal decentralization (Hao et al, 2020; Ji et al, 2021), green economy (Adam et al., 2020; Charfeddine & Kahia, 2019), and reducing economic policy uncertainty (Adedoyin and Zakari, 2020; Wang et al., 2020). We emphasize decentralization to address the objectives of the paper. Two hypotheses are available to assess the effect of decentralization on environmental sustainability, namely race-to-the-top vs. race-to-the-bottom. Scholars have reported both negative and positive correlations between decentralization and climate change. Consequently, there is no consensus on the impact of decentralization and climate change (Millimet, 2003; Farzanegan and Mennel, 2012; Phan et al., 2021).

The race-to-the-top model states that decentralization has positive effects on environmental degradation (Liu et al., 2017; Que et al., 2018), and various literature indicates that when decentralization is managed properly could contribute to environmental sustainability (Liu & Li, 2019; Rubinfeld, 1987). The assertion agrees with those who explored the potential “race-to-the-top” phenomenon, arguing that environmental decentralization can lead to efficiency gains (Oates, 1997; List & Mason, 2001). According to Molina (2018), the argument that fiscal decentralization reduces environmental degradation is true, but it depends on the quality of the institution. Conversely, the race-to-the-bottom hypothesis asserts that decentralization could lead to deregulations that could reduce environmental sustainability (Chen & Chang, 2020). Scholars, including Sigman (2005, 2014), Farzanegan & Mennel (2012), and Li et al. (2021), argued that decentralization negatively impacts the natural environment. Studies in China associate decentralization with negative environmental consequences (Chen & Liu, 2020; Liu et al, 2017). In Ghana, because of competition for budgetary allocation for developmental projects among various Metropolitan, Municipal, and District Assemblies (MMDAs), they invest less in environmental sustainability (Demi, 2019). Similarly, in China, it was reported that the local official prioritizes economic growth over cutting down emissions, leading to delays or incomplete enforcement of environmental policies (Cai et al., 2022; Que et al., 2018).

In Ghana, decentralization has been a pivotal mechanism by which the government ensures equitable distribution of developmental projects to various MMDAs. The implementation of the decentralization policy led to the establishment of the existing District Assembly system, which was enshrined in the 1992 Constitution of Ghana (Mensah et al., 2024). The District Assembly system is a key component of Ghana's decentralization process, serving as the primary local government institution responsible for the overall development of its district. Sub-district structures containing Urban, Town, Area, and Zonal (UTAZ) Councils, as well as Unit

Committees, are expected to serve as the practical link between the Metropolitan, Municipal, and District Assemblies (MMDAs) and the communities (Mensah et al., 2024). The decentralization in Ghana has significantly enhanced responsiveness to local needs and facilitated the significance of ownership and accountability among nationals (Mohammed, Tuokuu, Bokuma, 2025; Pervarah, 2026). Ghana's decentralization has played a crucial role in the equitable allocation of resources across regions, bridging the rural and urban divide, allowing remote locations to get attention and developmental aid. Furthermore, decentralization in Ghana has improved transparency by permitting citizens to engage with local officeholders and scrutinize the usage of public funds, thereby keeping them reassured and informed (Agyemang-Duah et al., 2018; Arkorful, 2021). Nonetheless, there are significant barriers to the process, including inadequate funding, limited technical ability, and political interference, which have periodically hindered the complete actualization of its benefits. Despite these challenges, decentralization remains a fundamental strategy in Ghana's actions to foster participatory governance and sustainable development. While striving to enhance local responsiveness and decision-making, decentralization in Ghana's agricultural sector has yielded a diverse range of effects. Although it has stimulated some extent of local ownership and potentially improved accountability to citizens, there have been some challenges, such as decreased funding, staffing problems, and problems in coordinating activities between various levels of government (Dzakaklo, Hlovor & Dah, 2023; Resnick, 2018). Despite extensive research about decentralization in Ghana, our review suggests scant information exists on the impact of decentralization on environmental sustainability in Ghana. Consequently, our study will be guided by the following research questions: What are the effects of decentralization on environmental sustainability and indigenous food systems in Ghana? The subsequent section will present a literature review, followed by the methodology of the study and the findings.

Literature Review

Before the introduction of the Western system of government, African societies were organized into kingdoms under the guidance of kings and chiefs (see Awortu & Michael, 2018; González-Ruibal, 2025). In the case of Ghana, the kings who control large areas have paramount chiefs and subchiefs who are given authority to rule their communities and villages. Various communities and villages have their own set of rules and regulations, and implement developmental policies and programs, which are achieved through communal labour. The rules and regulations are in line with the traditions and values of the communities. The traditional system of governments was tried and tested, and promoted social and cultural cohesion, respect for local authorities, communal or common property regimes, etc. The colonization of Africa and the imposition of the Western system of government undermined the traditional system of government (Akena, 2019; Aregbeshola & Adekunle, 2024). The authority and power were taken from the traditional rulers to the political elite, not based on their knowledge of the traditional rules and norms of societies, but based on academic credentials and proximity to the corridors of power. The introduction of the Western system of governance in a traditional setting without adequate recognition of local authorities concentrated power in the hands of political elites. Furthermore, governance was centralized at the national capital, creating a developmental gap in rural areas. To address the developmental gap, decentralization was introduced to bring governance to the

doorstep of people. Decentralization is a state of governance in which the central government hands over authority to lower levels of government in regional, municipal, or local domains (Faguet, 2021). We can categorize decentralization into three main groups, namely Administrative, Fiscal, and Political (Dick-Sagoe, 2020; Kyricou & Roca-Sagales, 2010). Administrative decentralization involves disseminating responsibilities like healthcare or education from the national level to the regional or local offices for efficient management. However, fiscal decentralization is a powerful tool that empowers local governments, giving them control over their finances in tax collection, budgeting, and spending instead of relying entirely on central funds (Dick-Sagoe, 2020; Kyricou & Roca-Sagales, 2010). This shift of power inspires hope for local government growth and development, making the audience feel inspired and optimistic about the future.

Furthermore, political decentralization describes the crucial power shift from central governments to local authorities, including mayors or councils. It emphasizes the crucial role of local authorities, giving them more power and responsibility for local people and ensuring accountability. This fosters a sense of engagement and responsibility among the populace, making them feel valued and respected. They are collectively targeted at bringing governance closer to the people, meaning that decision-making and resource allocation are brought to the local level, where they can be more responsive to the community's needs and preferences (Bardhan, 2002). This highlights the significance of institutional safeguards in protecting critical yet politically underappreciated sectors, such as agriculture, during decentralization reforms. These insights are particularly relevant for African countries that balance local accountability with continental commitments to agricultural development under frameworks such as the African Union's Comprehensive Africa Agriculture Development Programme (CAADP). There is a need for more nuanced strategies for decentralization that account for the reality of the political economy in agricultural policy implementation (Resnick, 2022). Additionally, despite widespread awareness of the policy among officials, decentralization in Ghana's agricultural sector has encountered significant implementation challenges because, while the Ministry of Food and Agriculture (MoFA) directors at higher levels exhibit a robust knowledge of decentralization, frontline staff at district levels show a declining awareness, resulting in varying levels of compliance (MoFA, 2007).

Obligations intended to be transferred to districts stay vastly centralized, with national and regional MoFA offices still dictating district-level job schedules and program decisions. This insufficient decentralization has led to inadequate coordination between ministries and district assemblies, thereby straining agricultural extension services. Staff shortages and inadequate training further hinder effective decentralization, as skilled personnel resist postings to rural districts (Antwi & Analou, 2008, a, b). Research-extension linkages are often weak in rural areas due to the low concentration of qualified staff and research institutions in urban centers (Antwi & Analou, 2008; Mapiye & Dzama, 2024).

There is ample evidence that decentralization affects environmental sustainability, as discussed above. However, the fact that environmental pollution is transboundary means that the polluting states or MMDAs can pass on their externality to neighbouring states or MMDAs (Wood, 2006). In the United States, for instance, states with stringent environmental policies locate their polluting industries at the border to pass on the externality to neighbouring states (Helland & Whitford, 2003; Monogan et al., 2017). A study in Pakistan and China indicated that the local

government attract industries through deregulation of stringent environmental policies (Guo et al., 2020; Li et al., 2021; Zhang et al., 2017). However, it has been observed that public agitation and social activism for quality environmental and sustainable planetary may force the government to invest in environmental sustainability measures (Cheng et al., 2020; Liu and Li, 2019)

In Ghana, the roots of decentralization trace back to the early 1980s, with significant momentum building on foundations laid even earlier. The pivotal moment in Ghana's decentralization journey arrived in 1988 when the government formally introduced a comprehensive decentralization policy under the Provisional National Defence Council (PNDC) regime. This program was launched in 1988 with the passage of the New Local Government Law 1988 (PNDC Law 207). Ghana's decentralization aimed at restructuring the public administration system through the assignment of revenue and expenditure and developmental decisions to district assemblies, shifting public administration from over-centralization to a decentralized model based on the principles of subsidiarity, economies of scope, economies of scale, and inter-jurisdictional spillovers (Institute for Fiscal Studies, 2017; Kathyola & Job, 2011). Ghana's 2012 decentralization reforms repositioned agricultural services to local governments to enhance accountability, but instead led to decreased funding and more vulnerable service delivery in the sector (Aboagye & Hillbom, n.d.; Resnick, 2022). The selected officials, responding to voter choices, prioritized obvious infrastructure projects over agricultural investments, such as extension services, which have less immediate political returns (Demi, 2019). Survey data from district agricultural officials and households indicate that this shift occurred even in farming-dependent areas, building tension between local democratic procedures and national agricultural development objectives. Decentralization, based on findings, has been demonstrated to have the ability to distort sectoral priorities when electoral incentives favour short-term, tangible projects over long-term agricultural productivity. Comparable patterns in Kenya and Uganda suggest this challenge expands beyond Ghana, highlighting a more comprehensive policy dilemma in decentralized governance (Resnick, 2022). Our cursory search reveals that despite extensive study on Ghana's decentralization, scanty information exists on its impact on Ghana's climate policy. Consequently, our study will fill the existing gap in research and provide insights into the effects of decentralization and shift in government policy on environmental sustainability in Ghana.

Methodology

This study is part of a broader project that investigated the effect of climate change on Indigenous food systems in Ghana (Demi & Ahmed, 2025; Demi, 2025; Demi and Sicchia, 2021). The study took a considerably long period of time, from March 2017 to February 2022, with numerous visits to study sites in Ghana. The researchers first visited Ghana in 2017 to develop an acquaintance with the local authorities, and the various districts' directors of agriculture, conducted preliminary data collection and used the subsequent visits for full data collection and follow-ups. Ghana has seven agroecological zones: Guinea Savannah, Coastal Savannah, Sudan Savannah, transitional zone, deciduous forest, moist evergreen and wet evergreen (Food and Agricultural Organization, 2005). These agroecological zones are hosted by 16 regions in Ghana. The agroecological zones and regions can be further categorized into three belts in Ghana, namely the Northern, Middle and Southern belts. Due to different vegetations, each of the belts is noted for its comparative advantage in producing certain crops. For instance, the northern belt is noted for growing Indigenous grain and cereals such as millet, sorghum, maize and various leguminous

crops such as cowpea, groundnut, Bambara groundnut and root and tubers such as yams, etc (MOFA, 2024). Because of dry climatic conditions and the abundance of grassland, the northern belt is also known for rearing ruminants such as goats, sheep and cattle. The middle belt is described as the food basket of Ghana because of its fertile soil, suitable for most of the food crops in Ghana, such as maize, cassava and yams. The southern belt, which hosts the tropical evergreen forest, is popular for growing most of the cash crops in Ghana, such as cocoa, coffee, oil palm, sugar cane and non-traditional export crops, pineapple (MOFA, 2024).

The researchers selected one region in each of the three belts. These regions are the Northern region (NR), representing the Northern belt, the Greater Accra region (GAR), representing the Southern belt and the Bono region (BR), representing the Middle belt. Furthermore, we selected one district/municipality in each of the regions where participants were drawn. The district selected includes the Tolon district, representing the Northern region and the Ga West and Wenchi Municipalities, representing the GAR and Bono regions, respectively. Finally, we selected various communities where participants were sampled. We used purposive sampling techniques to select all the participants. The broader study interviewed 105 participants majority of whom were smallholder farmers, but this study is limited to interviews conducted with students, government officials, and representatives of organizations working at the intersection of food and environment, and one opinion leader, excluding smallholder farmers.

Consequently, the sample for this study includes four (4) extension officers, each representing the Southern and Middle Belt and 2 representing the Northern belt. Furthermore, we sampled five (5) Agricultural students from the University for Development Studies, Nyankpala campus, from the Northern belt, 2 directors from the Ministry of Food and Agriculture, two (2) university professors, one (1) representative each from the Peasant farmers association of Ghana, the Food and Agriculture Organization (FAO) in Ghana and one opinion leader. In sum, a total of 16 participants were interviewed on a wide range of issues. Questions such as what is your opinion on Ghana's decentralization? How does decentralization facilitate or hinder your operation? What are the key policies you embark on to ensure environmental sustainability and address climate change etc? The method of data collection was mainly through qualitative one-on-one in-depth interviews. Furthermore, we conducted document analysis by reviewing various government Agricultural policy documents, including the Food and Agriculture Sector Development Policy (FASDEP I and II), Medium Term Agricultural Sector Investment Plan (METASIP II) and other relevant documents.

The data from various in-depth interviews were audio-recorded. The audio-recorded data were played and transcribed into text for analysis. We manually coded the transcript by reading through the data several times to make sense of the data. We further reviewed the data to correct minor grammatical mistakes. We used the research questions to create categories and created codes under each category. We recouped the categories into themes based on the objective of the study. We triangulated various datasets and drew inferences from the literature and our personal knowledge and experiences to conclude. The next section presents the findings of the study.

Result and Discussion

The government of Ghana introduced a decentralization policy aimed at moving governance to the grassroots level (Alam & Koranteng, 2011; MoFA, 2007). The government's goal in introducing decentralization is to grant autonomy to various Metropolitan, Municipal, and District

Assemblies (MMDAs), providing them with the opportunity and authority to initiate and implement their developmental projects in line with the national development agenda. This is in recognition of the fact that a one-size-fits-all model, where developmental projects were planned at the national level and distributed to the grassroots level, has not yielded the expected development. The Ghanaian decentralization resulted in the realignment of agricultural departments in the districts, which were formerly under the Ministry of Food and Agriculture (MoFA), to the District Assemblies. The finding confirms the earlier studies conducted in Ghana (Aboagye & Hillbom, n.d.; Resnick, 2022). Under the new arrangement, District Directors of Agriculture report directly to District Coordinating Directors (DCD), who are the heads of the district assemblies and report to Regional Ministers. Annual financial allocations to the District Department of Agriculture (DDA) for their budgetary operations go into the account of District Assemblies, who, in turn, release the funds to the Department of Agriculture. This arrangement, according to participants, negatively impacts the operations of DDA. It has caused a delay in receiving budgetary allocations to implement environmentally sustainable programmes and assistance to local farmers who need extension services.

According to one senior officer, decentralization has changed the chain of command, and MoFA head office in Accra (capital city) is now only responsible for policy formulation and has limited control of human resources at the district level. Another senior officer, however, disagrees:

I don't think that is the case because... if parliament approves funds for agriculture, it should trickle down. The only thing is... it is no longer coming to us directly as it was being done formerly, direct way, so we pay it into our account directly. Ahaa, and use it and report. But now it has to go to the District Assembly's account before they transfer it, and that one, too, it depends on your rapport with the District Director or those involved. If you don't have a good rapport, the thing will be there, and they will not mind you. So that is the thing, you will find it difficult. (MOII)

Despite the disagreement, MOII confirmed the delay in receiving a budgetary allocation and further revealed that an official from DDA must create a good rapport with DCD or fail to access their budgetary allocation. The findings of this study is consistent with the previous studies (Demi, 2019; Resnick, 2022). This reduces the influence and independence of officials from DDA, which aims to be apolitical. This finding agrees with the study conducted in Kenya and Uganda (Resnick, 2022). Again, it gives undue power to DCD, who decide when to release funds to ensure the smooth operation of DDA. This could limit the extent to which DDA implements environmentally sustainable programs, as these practices typically have a long-term effect and do not produce the immediate results expected by politicians. A senior MoFA official at the level of director, in responding to the question: What are you doing to tackle climate change and halt the extinction of indigenous food crops in Ghana, notes:

Climate change is real, and we are witnesses to its effects, but now, no practical solution has been suggested to address the problem associated with climate change. Farmers are helpless in the situation... Because the issues are there, but the problem too is that because they have also decentralized us into the district assembly, so like me, I can bring out these issues at the meeting, but nobody cares. The assembly, it looks like amm, we are not against

the decentralization, but the mindset of people. The things that need to be done before decentralization is perfect, is not there. There are small, small conflicts, like you are head of department, and you know, you know what your department needs, you are a technical person, but mostly if you give a recommendation on technical issues, fine, it is a recommendation without funding, no one cares, but when there is a money issue, then it becomes a problem. (MOI)

The quotes above outline some of the limitations of the decentralization process and how it hinders the chances of DDA to implement policies to tackle environmental issues. The national policy on agriculture recognizes the imminent danger of climate change to agricultural productivity in Ghana (MoFA, 2016a, b; 2015; 2007). The effects of climate change vary across districts; consequently, the individual district needs the flexibility to initiate its programmes to address a specific challenge. But from the quote above, recommendations from technocrats are not considered if not attached to any funding. The lack of initiatives targeting climate change has created deep gaps in areas affected by climate variability. According to one participant, these gaps are filled by NGOs who used the opportunity to promote sales of agrochemicals to farmers. The reduced influence and lack of funds at DDA further complicates their job, compelling one senior officer to contend:

So that is why I have been saying, being a District Director (of Agric) now is more of a headache than a job because you end up using your pocket money going here and there because you cannot sit down and say, I mean, I don't have money. You have to be proactive, so we end up using our money paying for fuel, maintenance, and all those things. (MOII)

As noted in the above quotes, the late release of funds is seriously affecting the work of the DDA. Farming is seasonal, and Agricultural Extension Agents (AEAs) are required to provide services to farmers at the right time. Hence, when funds are delayed, the damage done by the absence of extension services becomes irreversible. In one of the offices of DDA visited by the researchers, the office electricity was cut off for months due to non-payment of the electricity bill. The absence of electricity compelled workers to print confidential documents at commercial call centers, which are subject to hacks and disclosures of confidential information. Apart from the hindrance to the work of DDA, the delay in releasing the budgetary allocation is affecting extension delivery in Ghana, especially in the southern part. This could be attributed to the fact that farming communities in Ga West Municipality are becoming urbanized, hence the government is focusing on typical farming areas such as the Northern and middle belts. We observed that farmers in the Northern and Middle belt had better extension service than those in the South. For instance, extension officers in the Northern and Middle belt had motorcycles and gave their numbers to the farmers to call at any time for advice. However, these facilities and resources are lacking in the Southern belt.

Shift in Policy to Agricultural Modernization

The government of Ghana recognized climate as the most existential threat to indigenous food systems (MoFA, 2024). However, some of the policies, especially focusing on agricultural

modernization, are inimical to sustaining indigenous food systems, which anchored sustainable farming practices in Ghana. The first phase of the Food and Agriculture Sector Development Policy (FASDEP I) was launched in Ghana in 2002. The thrust of the policy was to outline strategies to modernize agriculture in Ghana (MoFA, 2007). FASDEP I, constitutes an upgrade of the old policy known as the Accelerated Agriculture Growth and Development Strategy (AAGDS). After four years of implementation of FASDEP I, the government of Ghana felt the need to revise the document to reflect changing circumstances and present challenges. With climate change becoming more apparent, the new document (FASDEP II) emphasized sustainable use of natural resources and commercialization of activities in food sectors anchored on market-driven growth (MoFA, 2007). According to the government document, the drivers of agriculture modernization are access to credit, innovative technology, good infrastructure and easy market opportunities for farmers (MoFA, 2007).

Concerning technological advancement, which constitutes a vital component of agricultural modernization, the emphasis has been on improving access to farm machinery, irrigation and food processing techniques (MoFA, 2016a, b; 2015; 2007). Some progress in agricultural mechanization is reported by research participants in the Middle and Northern belts during interviews. In some areas, sophisticated farm implements such as combine harvesters, which can harvest, shell and bag cereals for farmers, are available for use and farmers can pay both in cash or kind. MOI, a director of agriculture in one of the districts, notes:

... some too have increased their acreages, now we have more tractors in the system, ahaa, more tractors than before. But it is still not adequate anyway but people have access to farm machinery earlier, and individuals have also come in with combine (harvester). So, few people around now have their own combines... those days are not like this. It was difficult, rice will be on the field and the bushfire, is still there, but it has reduced, yeah, it has reduced.

The increase in tractor services occurred due to the government policy to allow private companies to import heavy farm machinery and enjoy a tax exemption to motivate importers to reduce the cost of farm implements. Previously, farmers harvested their farm produce manually, and this takes a longer time, and sometimes food crops were destroyed due to unexpected rain or fire outbreaks. The availability of combine harvesters has reduced on-farm losses. Denyi explains how the presence of farm machinery has eased farming activities in the Middle Belt:

...now maize, while you are harvesting on the land, there is a machine that removes the maize from the cob, now modern knowledge, we don't use our hands to remove maize from the cob again. We have a machine that comes to your farm direct, doing the dehusking and shelling. (IdI).

The policy document (FASDEP II) aimed at supporting smallholder farmers who constitute the majority of the farming population (MoFA, 2016b; 2010). Through the initiative, DDA, especially in the Northern and Middle belts, have intensified farming education, resulting in many farmers adopting Western agronomic practices:

... because of the technology and the technical advice, we give them [farmers] on how to go about it, because I can say that ten years ago or twenty years ago may be many farmers were doing their own thing. But now all of them have to plant in rows, all know that

improved seed is good, all know that agronomic practices timely is good, timely harvesting is good, so you have more farmers doing these than before. (MOI)

The quote forms part of the policy targeting a few improved varieties to help ensure food security (MoFA, 2007); as a result, the focus of agricultural education is tilted towards agricultural intensification at the expense of environmental sustainability. Even though the policy document advocates for sustainable farming practices, senior MoFA officials confirmed that less than 2% of farmers practice sustainable agriculture, such as organic farming, because of a lack of incentives. Nevertheless, the policy document (FASDEP II) emphasizes the relevance of indigenous food crops in the local food system. Analysis of policy documents shows that the term “Indigenous” was mentioned seven (7) times, while modernization was mentioned four (4) times in FASDEP II. Also, worth noting is that “Indigenous” was mentioned to specifically identify and promote the production and commercialization of Indigenous crops.

On the other hand, modernization was mentioned concerning the application of science and technology in food production. However, in the subsequent documents that outlined the programme of action - Medium Term Agricultural Sector Investment Plan (METASIP) II, 2014 – 2017 (MoFA, 2015a), and Agricultural Sector Progress Report 2015 (MoFA, 2015b) which account for the progress achieved - there was no single mention of “Indigenous” in both documents but modernization was mentioned fourteen (14) times in METASIP II and once (1) in Agricultural Sector Progress 2015. The absolute silence on the word “Indigenous” in these documents highlights the inherent reluctance of incorporating Indigenous knowledge effectively in a national action plan (Adiku, 2013; Gachanga, 2007). Gachanga (2007) notes:

Despite acknowledgment of the critical role indigenous knowledge plays in sustainable development and peace building, many governments, donors, and NGOs appear to make little use of this valuable resource. Their recognition of indigenous knowledge often amounts to little more than lip service, seldom translating into action or funding. (p. 11)

Gachanga’s quote revealed the lack of urgency attached to Indigenous Knowledge by policymakers as found in this study. So, the critical question is: to what extent has continuous silence and neglect of Indigenous Ghanaian knowledges contributed to the loss of valuable knowledge on local food, pharmacology and environmental management in Ghana? Agricultural modernization supporting smallholder farmers with technologies and farm credits to improve their productivity is good. However, it also undermines environmentally sustainable practices which local farmers have gathered for centuries. The study found that very few farmers benefit from such technologies or credit, and the modernization policies undermine indigenous food systems in Ghana. As one participant argues, modernization does not mean abandoning IK:

...agricultural modernization is good, but sometimes the way we implement it, ahaa. Modernizing agriculture even sometimes has to do with our indigenous crops, but what happens is that modernization starts from the top and trickles down, instead of down to the top. So, they sit at the headquarters, say we are modernizing agriculture, and they are looking at Jasmin rice, they are looking at carrots, they are looking at snails, and all that, forgetting that we have bra (kenaf) at the grassroots here, forgetting that people eat kapok

leaves, so how do we modernize that? Modernization is just letting people see or add value and accept what they are eating, and eat it health-wise. To be able to use what they have to improve their standard of living, eat, sell some and add value and move on. But if we try to look at modernization at some level, we might be cutting off some people, so we have to look at it from all directions and see what we need to modernize. It doesn't necessarily mean changing the face of something, but adding value could also be modernization. That to me is real thinking. (Agent 2)

This quote raises critical questions: who do we sideline in the modernization process and why? Why should modernization start from the top down rather than bottom up? These critical questions need answers in order not to alienate smallholder farmers in our quest to modernize agriculture overzealously. The extension officer agreed that decentralization is good, but how it is implemented in Ghana is besieged with several challenges. Another government official argued that decentralization is beneficial, but requires extensive education and conscientization of the government ministries and departments to ensure its smooth operations.

Conclusion

The study examined the effects of decentralization on environmental sustainability and indigenous food systems in Ghana. The study discovered that the decentralized policy has resulted in detachment of the District Department of Agriculture (DDA) from the Ministry of Food and Agriculture and placed them under the Metropolitan, Municipal, and District Assemblies (MMDAs). Consequently, budgetary allocations to DDAs go into the account of MMDAs before being forwarded to the DDA. This causes a significant delay to DDAs in receiving funds to implement environmentally sustainable policies, resulting in considerable impact on traditional food crops, which are growing with less resistance to the worsening climate. The study further discovered that shift in government policy towards agricultural modernization undermines indigenous food system. The study recommends that the government should prioritize environmental sustainability in Ghana to save the indigenous food system from extinction. Furthermore, the government should grant DDAs autonomy to initiate and implement environmental sustainability policies specific to their localities and ensure early release of funds to MMDAs. The government should ensure a mechanism by which the budgetary allocation to DDAs automatically hits their account as soon as it is credited to the MMDAs' account to curtail delays.

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